

Strange Attractors

for orchestra

Alexandra T Bryant
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Duration: approx 8'00"

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Program Notes

In mathematics, a *strange attractor* is a self-referencing, dynamical system which evolves over time into a subtle, complex pattern. It walks a fine line between complete regularity and utter chaos, never repeating itself exactly but always cyclically haunting the same paths.

Like these transient mathematical forms, the instrumental lines in *Strange Attractors* possess contours, shapes, and melodies which recur in recognizable patterns throughout the piece, yet never twice repeat themselves in the same way – they are ever changing, evolving, and expanding.

The individual musical elements – such as the opening motif of the piccolo and celesta, the asymmetrical rhythmic pattern of the winds and strings immediately following, as well as the descending figure found in the violas and cellos at the conclusion of the first climax – together provide a dynamic and organic whole which is esthetically greater than a simple linear addition of their parts.

Instrumentation

Piccolo
Flute I & Flute II (doubled on Alto Flute)
Oboe I & II
English Horn
Clarinet in Bb I & II
Bass Clarinet
Bassoon
Contrabassoon

Horn I, II, III, & IV
Trumpet I, II, & III
Trombone I & II
Bass Trombone
Tuba

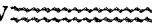
Timpani
Percussion I: Suspended Cymbal, Tom-Tom (3), Bass Drum, Marimba, Claves, Snare Drum, Tubular Bells
Percussion II: Glockenspiel, Woodblock, Tam-Tam, Cymbal, Vibraphone (bowed), Tubular Bells, Slapstick

Harp
Piano & Celesta

Strings

Performance Notes

If contrabass does not have a C extension, play the octave up.

Harp: V  found on pages 1-2, is the notation for an ascending pitch bend (as in the piccolo and flutes)

Contrabass, page 7, measure 48, the upper voice should be pizzicato, while the lower voice is arco.

Violin I, pages 12-14, indicate a divisi a3 solo passage. As indicated, the top staff should be performed by the first stand and the second staff by third chair. The tutti line is also included on the second staff and should be distinguishable between the solo line.

The strings, on pages 13-15, should begin by playing divisi a3, slowly begin to hum the note he or she is playing, and then finally switch to humming only, all of which are notated. It should not be evident from the audience where the sound is coming from.

RICE UNIVERSITY

Strange Attractors for Orchestra

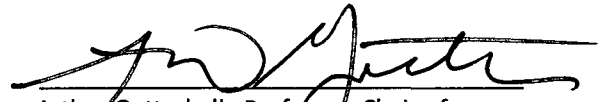
by


Alexandra Tyler Bryant

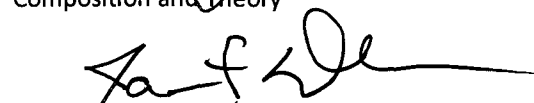
A THESIS SUBMITTED
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE

Master of Music

APPROVED, THESIS COMMITTEE:



Arthur Gottschalk, Professor, Chair of
Composition and Theory

Pierre Jalbert, Associate Professor of
Composition and Theory

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HOUSTON, TEXAS
APRIL 2010

ABSTRACT

Strange Attractors for Orchestra

by

Alexandra Tyler Bryant

In mathematics, a *strange attractor* is a self-referencing, dynamical system which evolves over time into a subtle, complex pattern. It walks a fine line between complete regularity and utter chaos, never repeating itself exactly but always cyclically haunting the same paths.

Like these transient mathematical forms, the instrumental lines in *Strange Attractors* possess contours, shapes, and melodies which recur in recognizable patterns throughout the piece, yet never twice repeat themselves in the same way – they are ever changing, evolving, and expanding.

The individual musical elements – such as the opening motif of the piccolo and celesta, the asymmetrical rhythmic pattern of the winds and strings immediately following, as well as the descending figure found in the violas and cellos at the conclusion of the first climax – together provide a dynamic and organic whole which is esthetically greater than a simple linear addition of their parts.

Strange Attractors

for orchestra

♩ = 120 Whimsical with celesta

♩ = 80 Agitated (♩ = ♩)

brnd

Piccolo

Flute I, II

Oboe I, II

English Horn

Clarinet I, II

Bass Clarinet

Bassoon

Contrabassoon

♩ = 120 Whimsical

♩ = 80 Agitated (♩ = ♩)

Horn I, III

Horn II, IV

Trumpet I, II

Trumpet III

Trombone I, II

Bass Trombone

Tuba

♩ = 120 Whimsical

♩ = 80 Agitated (♩ = ♩)

Timpani

Percussion

Sur Cym

Glockenspiel

Woodblock

to tom-tom

to woodblock

Harp

D C B1 E1 F OA

U1

V

Celesta, with piccolo

to piano

Piano & Celesta

♩ = 120 Whimsical

♩ = 80 Agitated (♩ = ♩)

Violin I

Violin II

Viola

Violoncello

Contrabass

This page of the musical score contains the following instruments and parts:

- Picc.** (Piccolo)
- Fl. I, II** (Flutes)
- Ob. I, II** (Oboes)
- E. Hrn.** (English Horn)
- Cl. I, II** (Clarinets)
- B. Cl.** (Bass Clarinet)
- Bsn.** (Bassoon)
- C. Bsn.** (Contrabassoon)
- Hn. I, II** (Horns)
- Hn. III, IV** (Horns)
- Tpt. I, II** (Trumpets)
- Tpt. III** (Trumpet)
- Tbn. I, II** (Trombones)
- B. Tbn.** (Baritone Trombone)
- Tuba**
- Timp.** (Timpani)
- Perc.** (Percussion)
- Hrp.** (Harp)
- Pno/Cel.** (Piano/Cello)
- Vla. I** (Violin I)
- Vla. II** (Violin II)
- Vla.** (Viola)
- Vcl.** (Violoncello)
- Db.** (Double Bass)

The score includes various musical notations such as notes, rests, and dynamic markings (p, mp, pp, f). It also features articulation marks like accents and slurs, and specific performance instructions like "arco, sul G" and "pizz. divi".

Strange Attractors

3

[illegible]

5

[illegible]

This page of a musical score, likely for a symphony, contains staves for the following instruments:

- Pic.
- Fl. I, II
- Ob. I, II
- E. Hn.
- Cl. I, II
- B. Cl.
- Bsn.
- C. Bsn.
- Hn. I, III
- Hn. II, IV
- Tpt. I, II
- Tpt. III
- Tbn. I, II
- B. Tbn.
- Tuba
- Timp.
- Perc.
- Perc.
- Harp (Hp.)
- Piano/Cello (Pao./Cel.)
- Vln. I
- Vln. II
- Vla.
- Vcl.
- Cb.

The score includes various musical notations, dynamics (e.g., *mf*, *f*, *ppp*), and performance instructions (e.g., *con sord*, *senza sord*, *to Piano*, *div. pizz*). The page number 40 is visible at the top left.

This page of a musical score, likely for a symphony, contains staves for the following instruments and parts:

- Pic.** (Piccolo)
- Fl. I, II** (Flutes)
- Ob. I, II** (Oboes)
- E. Hn.** (English Horn)
- Cl. I, II** (Clarinets)
- B. Cl.** (Bass Clarinet)
- Bsn.** (Bassoon)
- C. Bsn.** (Contrabassoon)
- Hn. I, II** (Horns)
- Hn. III, IV** (Horns)
- Tpt. I, II** (Trumpets)
- Tpt. III** (Trumpet)
- Tbn. I, II** (Trombones)
- B. Tbn.** (Baritone Trombone)
- Tuba**
- Timp.** (Timpani)
- Perc.** (Percussion, including bass drum, snare drum, and cymbals)
- Harp**
- Piano/Cel.** (Piano and Cello)
- Vln. I, II** (Violins)
- Vla.** (Viola)
- Vc.** (Violoncello)
- Cb.** (Contrabass)

The score includes various musical notations such as notes, rests, and dynamic markings (e.g., *f*, *p*, *mf*, *ff*, *pp*). A rehearsal mark **B** is located at the top of the page. The page number **47** is visible in the top left corner.

This page of a musical score, likely from a symphony, contains the following elements:

- Instrumentation:** The score is written for a large orchestra, including Piccolo (Picc.), Flutes I & II (Fl. I, II), Oboes I & II (Ob. I, II), Horns I, II, III, & IV (Hn. I, II, III, IV), Trumpets I & II (Tpt. I, II), Trombones I, II, & III (Tbn. I, II, III), Tuba (B. Tbn.), Timpani (Timp.), Percussion (Perc.), Harp (Hp.), Piano/Cello (Pno./Cel.), Violins I & II (Vln. I, II), Viola (Vla.), Violoncello (Vcl.), and Double Bass (Cb.).
- Musical Notation:** The score uses standard musical notation, including notes, rests, and dynamic markings such as *mp* (mezzo-piano), *cresc. poco a poco* (crescendo poco a poco), *decrescendo poco a poco* (decrescendo poco a poco), *f* (forte), and *pp* (pianissimo).
- Performance Instructions:** Specific performance directions are provided for certain instruments, such as *su marimba* (on marimba) and *su vibraphone* (on vibraphone) for the Percussion part.
- Page Number:** The page is numbered 57 in the top left corner.

9

C ♩ = 66 *Poignant*

81 *un poco meno mosso* D ♩ = 72 Poetic

Picc. *mf*

Fl. I, II *mf*

Ob. I, II *mf*

E. Hn. *mf* *solo, espressivo* *pp* *mf*

Cl. I, II *mf* *pp* *mf*

B. Cl. *mf* *pp* *mf*

Bsn. *mf* *pp* *mf*

C. Bn. *mf* *pp* *mf*

Hn. I, III *un poco meno mosso* ♩ = 72 Poetic

Hn. II, IV

Tpt. I, II

Tpt. III

Tbn. I, II

B. Tbn.

Tuba *pp*

Tymp. *un poco meno mosso* ♩ = 72 Poetic

Perc. *Marimba* *p*

Perc. II *(Microphone - bowed)* *f*

Hp **shimmer** *mf*

Pno./Cel. *Celista* **shimmer** *mf*

Vla. I *81 (div)* *un poco meno mosso* ♩ = 72 Poetic *uniz, non vib. sul pont*

Vln. II *(div)* *mf* *pp* *non vib. sul pont*

Vla. *(div)* *mf* *pp* *uniz, non vib. sul pont*

Vc. *(div)* *mf* *pp* *non vib. sul pont*

Cb. *mf* *pp* *non vib. sul pont*

D

88

Picc.

Fl. I, II

Ob. I, II

E. Hn. *quasi rubato*

Cl. I, II

B. Cl.

Bsn.

C. Bn.

88

Hn. I, III

Hn. II, IV

Tpt. I, II

Tpt. III

Tbn. I, II

B. Tbn.

Tuba

88

Timp.

Perc. I

Perc. II

Hp.

Pno./Cel.

88

Vln. I

Vln. II

Vla.

Vc.

Cb.

93

Picc.

Fl. I II

Ob. I II

E. Hn.

Cl. I II

B. Cl.

Bsn.

C. Bsn.

93

Hr. I III

Hr. II IV

Tpt. I II

Tpt. III

Tbn. I II

B. Tbn.

Tuba

93

Timp.

Perc. I

Perc. II

Hr.

93

Pno/Cel.

Vln.

Vln. I

Vln. II

Vla.

Vcl.

Cb.

93

E

100

Picc.

Fl. I, II

Ob. I, II

E. Hn.

Cl. I, II

B. Cl.

Bsn.

C. Bn.

100

Hn. I, III

Hn. II, IV

Tpt. I, II

Tpt. III

Tbn. I, II

B. Tbn.

Tuba

100

Timp.

Perc.

Perc. II

Hp.

Pno./Cel.

100

Vln.

Vln. I

Vln. II

Vla.

Vc.

Cb.

2. se alto flaut

pp

mf

p

to woodblock

div

con vib. natural

no (flut.) con vib. natural

unla

div a3

nat. div a3

p

[illegible]

III *solo*

Picc.

Fl. I, II

Ob. I, II

E. Hn.

Cl. I, II

B. Cl.

Bsn.

C. Bn.

2 to flute

III

Hn. I, III

Hn. II, IV

Tpt. I, II

Tpt. III

Tbn. I, II

B. Tbn.

Tuba

III

Timp.

Perc.

Perc.

Hp.

Pno./Ccl.

III

Vln. I

Vln. II

Vla.

Vc.

Cb.

ham sax only - stagger changes

arco and

arco and

arco and

arco and

Strange Attractors

F

116 ♩ = 96 Agitated (♩ = ♪)

Perc.

Fl. I & II

Ob. I & II

E. Ho.

Cl. I & II

B. Cl.

Bsn.

C. Bn.

Hr. III

Hr. IV

Tpt. I & II

Tpt. III

Tbn. I & II

B. Tbn.

Tuba

116 ♩ = 96 Agitated (♩ = ♪)

Timp.

Perc.

Perc.

Hp.

D E C E B E F G A

Pho./Cel.

116 ♩ = 96 Agitated (♩ = ♪)

Vln. I

Vln. II

Vla.

Vcl.

Cb.

F

Strange Attractors

17

[illegible]

131

G ♩ = 80 Chilling

Picc.

Fl. I, II

Ob. I, II

E. Hn.

Cl. I

Cl. II

B. Cl.

Bsn.

C. Bn.

Hn. I, III

Hn. II, IV

Tpt. I, II

Tpt. III

Tbn. I, II

B. Tbn.

Tuba

131 ♩ = 80 Chilling

Timp.

Perc.

Perc. II

Hp.

Pno./Cel.

131 ♩ = 80 Chilling

Vln. I

Vln. II

Vla.

Vcl.

Cb.

G

136

Picc.

Fl. I II

Ob. I II

E. Hrn.

Cl. I

Cl. II

B. Cl.

Ban.

C. Bn.

136

Hr. I III

Hr. II IV

Tpt. I II

Tpt. III

Tbn. I II

B. Tbn.

Tuba

136

Timp.

Perc.

Perc. II

Hp.

Pno./Ccl.

136

Vln. I

Vln. II

Vla.

Vc.

Ch.

141

Picc.

Fl. I, II

Ob. I, II

E. Hn.

Cl. I

Cl. II

B. Cl.

Bon.

C. Bn.

Hn. I, III

Hn. II, IV

Tpt. I, II

Tpt. III

Tbn. I, II

B. Tbn.

Tuba

Timpani

Perc.

Perc. II (Glöckenspiel)

Hr.

Pno./Cel.

Vln. I

Vln. II

Vla.

Vcl.

Ch.

144 **H** *solo, with English horn* *solo, with cello* *soli, with cello*

Picc. *p* *mp*

Fl. I, II *p*

Ob. I, II *1. solo* *mp*

E. Hn. *solo with piccolo* *p*

Cl. I *pp* *p* *mp*

Cl. II *pp* *p* *mp*

B. Cl. *p*

Bsn. *pp* *p* *mp* *mf*

C. Bn. *pp* *p* *mp* *mf*

Hn. I, III *1.* *mp*

Hn. II, IV *2. con aord* *4. con aord* *mp*

Tpt. I, II *1. soli, with viola and cello* *mp*

Tpt. III *p* *mp*

Tbn. I, II *pp* *p* *mp* *mf*

B. Tbn. *pp* *p* *mp* *mf*

Tuba *pp* *p* *mp* *mf*

Timp. *pp*

Perc. *(blockenspiel)* *mp* *mf*

Perc. II

Hp.

Pno./Cel. *Celano, soli with flute* *soli, with piccolo* *mp*

Vln. I *144* *(pp)* *p*

Vln. II *p*

Vla. *pp* *mp* *mf*

Vc. *pp* *mp* *mf*

Cb. *pp* *p* *mp* *mf*

H

Strange Attractors

23

148

Picc. *sf* *f* *mf* *mf*

Fl. I, II *1 solo* *mp* *mf* *mp*

Ob. I, II *mf* *mp* *mf*

E. Fl. *mf* *mp* *f*

Cl. I *mf* *mp* *f*

Cl. II *mf* *mp* *f*

B. Cl. *mf* *mp* *f*

Bsn. *mf* *mp* *mf*

C. Bn. *mf* *mp* *mf*

Hr. I, III *148* *mp*

Hr. II, IV *2* *mf* *mp* *mf*

Tpt. I, II *1* *mf* *mp* *mf*

Tpt. III *2* *mf* *mp* *mf*

Tbn. I, II *mf* *mp* *mf*

B. Tbn. *mf* *mp* *mf*

Tuba *mf* *mp* *mf*

Timp. *148* *mf*

Perc. *mf* *mp* *mf*

Perc. II *mf* *mp* *mf*

Hp. *mf* *mp* *mf*

Pho./Cel. *148* *mf*

Vln. I *148* *mf* *mp* *mf*

Vln. II *148* *mf* *mp* *mf*

Vla. *mf* *mp* *mf*

Vc. *mf* *mp* *mf*

Ch. *mf* *mp* *mf*

154

Picc. *1 soli, with bass clarinet and trumpet*

Fl. I, II *mp*

Ob. I, II

E. Hrn.

Cl. I, II *mp*

B. Cl. *soli, with flute and trumpet*

Bsn.

C. Bsn.

Hr. I, III *1*

Hr. II, IV *2*

Tpt. I, II *2 soli, with flute and English horn*

Tpt. III

Tbn. I, II

B. Tbn.

Tuba

151

Timp.

Perc.

Perc. II *(gluckenspiel)*

Hp. *soli, with flute and trumpet*

Piano, with clarinet *mp*

Pno./Cel.

155

Vln. I *mp*

Vln. II *mp*

Vla.

Vcl.

Cb.

154

Picc. *f*

Fl. I, II *f*

Ob. I, II *f*

E. Fla. *f*

Cl. I, II *f*

B. Cl. *f*

Bsn. *f*

C. Bn. *f*

Hr. I, III *f*

Hr. II, IV *f*

Tpt. I, II *f*

Tpt. III *f*

Trbn. I, II *f*

B. Trbn. *f*

Tuba *f*

Timp. *f*

Perc. *f*

Perc. II *f*

Hp. *f*

Pno./Cel. *f*

Vln. I *f*

Vln. II *f*

Vla. *f*

Vc. *f*

Cb. *f*

1

snare drum (m)

Tom-Tom

switch to Tubular Bells

Bubbling

with flutes

1

161

Picc. 

Fl. II 

Ob. I, II 

E. Flute 

Cl. I, II 

B. Cl. 

Bsn. 

C. Bsn. 

161

Hr. I, III 

Hr. II, IV 

Tpt. I, II 

Tpt. III 

Tbn. I, II 

B. Tbn. 

Tuba 

161

Timp. 

Perc. 

Perc. II 

Hp. 

Pano./Cel. 

161

Vln. I 

Vln. II 

Vla. 

Vc. 

Cb. 

164

Picc. 

Fl. II 

Ob. I, II 

E. Hn. 

Cl. I, II 

B. Cl. 

Bsn. 

C. Bn. 

Hn. I, III 

Hn. II, IV 

Tpt. I, II 

Tpt. III 

Tbn. I, II 

B. Tbn. 

Tuba 

164

Timp. 

Perc. 

Perc. II 

Hp. 

Pno./Cel. 

164

Vln. I 

Vln. II 

Vla. 

Vc. 

Ch. 

Strange Attractors

167 $\text{♩} = 72$ Haunting

Picc. mf

Fl. I, II mf

Ob. I, II mf

E. Hn. mf

Cl. I, II mf

B. Cl. mf

Bsn. mf

C. Bsn. mf

Hr. I, II mf

Hr. II, IV mf

Tpt. I, II mf

Tpt. III mf

Tbn. I, II mf

B. Tbn. mf

Tuba mf

167 $\text{♩} = 72$ Haunting

Timp. mf

Perc. mf

Perc. mf

Hp. mf

Pno/Cel. mf

167 $\text{♩} = 72$ Haunting

Vln. I mf

Vln. II mf

Vla. mf

Vcl. mf

Cb. mf

173 *un poco rit.*

Picc.

Fl. I, II *celato flauti* *with celesta* *with harp* *fz*

Ob. I, II

E. Fla.

Cl. I, II

B. Cl.

Bsn.

C. Bsn.

Hr. I, II *un poco rit.*

Hr. II, IV

Tpt. I, II

Tpt. III

Tbn. I, II

B. Tbn.

Tuba

Timp.

Perc. I *Tubular bells*

Perc. *(tam-tam)* *ffff*

Harp *with alto flute*

Pno./Cel. *Celesta solo*

Vln. I *un poco rit.*

Vln. II

Vla.

Vc.

Cb.

[illegible]

185 $\text{♩} = 100$ Evocative ($\text{♩} = \text{♩}$)

Picc. mf fz

Fl. I, II fz f fz

Ob. I, II fz

E. Hn. fz

Cl. I, II fz

B. Cl. fz

Bsn. fz

C. Bn. fz

Hr. I, II fz pp f pp f pp f

Hr. II, IV fz pp f pp f pp f

Tpt. I, II fz pp f pp f pp f

Tpt. III fz pp f pp f pp f

Tbn. I, II fz pp f pp f pp f

B. Tbn. fz pp f pp f pp f

Tuba fz pp f pp f pp f

Timp. fz pp f pp f pp f

Perc. I fz pp f pp f pp f

Perc. II fz pp f pp f pp f

Hp. fz pp f pp f pp f

Pno./Cel. fz pp f pp f pp f

Vln. I fz pp f pp f pp f

Vln. II fz pp f pp f pp f

Vla. fz pp f pp f pp f

Vc. fz pp f pp f pp f

Cb. fz pp f pp f pp f

Gluckenspiel f

DECEBER OF AS A I

192

Pic.

Fl. I, II

Ob. I, II

E. Hn.

Cl. I, II

B. Cl.

Bsn.

C. Bsn.

192

Hn. I, II

Hn. III, IV

Tpt. I, II

Tpt. III, IV

Tbn. I, II

B. Tbn.

Tuba

192

Timp.

Perc. I

Perc. II

Hrp.

Pno/Cel.

192

Vln. I

Vln. II

Vla.

Vcl.

Ch.

Strange Attractors

This page of a musical score, likely for a symphony, contains staves for the following instruments and parts:

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- Cl. I, II** (Clarinets)
- B. Cl.** (Bass Clarinet)
- Bsn.** (Bassoon)
- C. Bsn.** (Contrabassoon)
- Hn. III, IV** (Horns)
- Tpt. I, II, III** (Trumpets)
- Tbn. I, II** (Trombones)
- B. Tbn.** (Baritone Trombone)
- Tuba**
- Timp.** (Timpani)
- Perc.** (Percussion, including bass drum and pluck strings)
- Hp.** (Harp)
- Pno/Cel.** (Piano/Cello)
- Vln. I, II** (Violins)
- Vla.** (Viola)
- Vc.** (Violoncello)
- Cb.** (Double Bass)

The score includes musical notation, dynamics (e.g., *pp*, *f*, *sf*), and performance instructions (e.g., *non div.*, *plucking*, *div. a2*). The page is numbered 199 at the top left.

203

Picc.

Fl. I, II

Ob. I, II

E. Hn.

Cl. I, II

B. Cl.

Bsn.

C. Bn.

Hr. I, III

Hr. II, IV

Trpt. I, II

Trpt. III

Tbn. I, II

B. Tbn.

Tuba

Timp.

Perc.

Perc. II

Hp.

Pno/Cel.

Vln. I

Vln. II

Vla.

Vc.

Ch.

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